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Zero point energy of a massless scalar field in the cosmic string space-time

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Abstract

We consider the ground state energy of a massive scalar field in the space-time of a thick cosmic string in the 2 + 1 dimensional case for arbitrary angle deficit by using the zeta-function approach. Final numerical calculations were made in the massless case, only. We show that the zero point energy is negative, and for small angle deficit it is proportional to the fourth degree of the deficit.

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Keywords

Cosmic string, Deficit angle, Scalar field, Zeta-function